APPARATUS AND METHODS FOR PLASMA VAPOR DEPOSITION PROCESSES

ABSTRACT OF THE DISCLOSURE

One aspect of the invention is directed toward a method of forming a conductive layer on a microfeature workpiece. In one embodiment, the method comprises depositing an electrically conductive material onto a first microfeature workpiece in a vapor deposition process by flowing a gas into a plasma zone of a vapor deposition chamber and transmitting an energy into the plasma zone via a transmitting window. The energy transmitted through the window and into the plasma zone produces a plasma from the gas. The energy, for example, can be microwave radiation. The plasma produced from the gas forms a conductive layer on the workpiece in either a CVD or an ALD process. The process of forming the conductive layer on the workpiece concomitantly forms a secondary deposit of a residual film on the window. The residual film has a first transmissivity to the energy used to generate the plasma. This embodiment of the method further includes changing the residual film on the window to have a second transmissivity to the energy. The second transmissivity, for example, can be less than the first transmissivity such that changing the residual film to have the second transmissivity increases the amount of plasma energy that can propagate through the window and into the plasma zone.